



AUTHORSHIP AND COLLABORATIVE PATTERNS IN IEEE/ACM TRANSACTIONS ON NETWORKING

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ABSTRACT

The *bibliometrics* and *scientometrics* are set of methods used for measuring the production and dissemination of the scientific knowledge's. This study explore that the *scientometric* techniques were applied to analyze the authorship trend in online journal of "IEEE/ACM Transactions on Networking" during the period of 2010-2014. A total of 735 articles and 2540 authors in the journal were examined by year and volume to ascertain authorship patterns, author productivity and degree of collaboration.

KEYWORDS: *Bibliometrics, Scientometrics, IEEE/ACM Transactions on Networking, Authorship Pattern, Degree of collaboration, Author productivity.*

Introduction:

The term bibliometrics and scientometrics are synonymously used to measure researcher's science and technical development. scientometrics is the study dealing with the quantification of written communication which helps in the measurement of the published knowledge by analyzing literature, inter relationship among different branches of knowledge, productivity, authorship pattern, degree of collaboration pattern of collection building and their uses. As with any other discipline, the overall intellectual productivity and scientific contribution of an individual/organization is evaluated chiefly by written literature- mainly in the form of publications in peer-reviewed journal.

Literature Review:

The review of literature have been studied by several authors analyzed the contributions of different journal of various fields. Thavamani and Velmurugan (2013) studied the publication trends of scholarly papers in Annals of Library and Information Studies published in New Delhi, India through a bibliometric analysis of 310 contributions in the journal during the year 2002–2012. Rattan and Gurjeet Kaur (2012) studied the "Malaysian Journal of Library & Information Science from 2007 to 2011 and found that authorship pattern.

Nosheen and Ahmad (2011) studied "Pakistan Journal of Library and Information Science published from 1995 to 2010" and traced the "author productivity, extent of authors' collaboration, authors' institutional affiliation, authors' geographic affiliation, type of publication, and year-wise distribution of papers. According to Thanuskodi (2010) the majority of articles of bibliometric study contain authorship trend to journal, books, conference proceedings, dissertations etc.

History and Profile of IEEE/ACM Transactions on Networking:

The Journal of IEEE/ACM Transactions on Networking is one of the foremost research journals in the communication and networking field. It is Published Bimonthly online Electronic Journal. It is published cosponsored by the IEEE Communications society, IEEE computer society and the ACM (Association for computing Machinery). This journal covers the subject like network architecture and design, communication protocols, network software, network technologies, network services and applications and network operation management. The scope of journal includes all topics on communication and networking. The present study aims to explore the scientometric analysis of the research work on IEEE/ACM Transactions on networking selected five year published article period between 2010 – 2014.

Methodology:

The data was collected from www.ieeeexplore.ieee.org/website online journal IEEE/ACM Transactions on Networking covering the period 2010 to 2014. seven hundred and thirty five articles and related information about by year, number of authorship, author's productivity, single and multi-authored by year, degree of collaboration were recorded. These data were organized, tabulated analyzed in Ms-Excel spread sheet by using simple arithmetic and statistical methods.

Data Analysis:

Table: 1 Contribution of Articles by Year and Issues

Sl:No	Year	Issue-1	Issue-2	Issue-3	Issue-4	Issue-5	Issue-6	Total	Percent
1	2010	25	25	25	25	25	25	150	20.41
2	2011	23	24	24	23	24	23	141	19.18
3	2012	24	23	26	25	26	25	149	20.27
4	2013	25	24	25	24	24	25	147	20
5	2014	25	25	25	25	23	25	148	20.14
Total		122	121	125	122	122	123	735	100

During the period 2010-2014 scientist all over the world have produced a total of 735 papers. Table-1 shows that the growth trend was linear. It is evident that the publication of 2010 were 150 and that went down to 141 in 2011. The fluctuations in publication pattern were observed throughout the period of study.

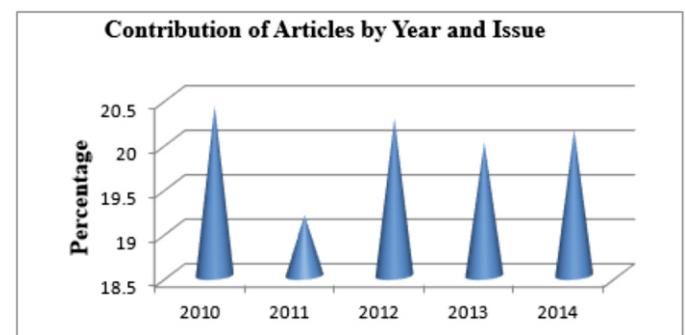


Figure: 1

Table: 2 Authorship Patterns by Year/Volume

Sl. No	Year	Volume	Authors per Article					Total No of Papers (%)	Total No of Authors (%)
			Single	Two	Three	Four	Five & Above		
1	2010	18	6	43	47	32	22*	150(20.41%)	480 (18.9%)
2	2011	19	2	31	59	30	19 *	141(19.18%)	463(18.23%)
3	2012	20	—	35	49	39	26 *	149(20.27%)	520(20.47%)
4	2013	21	1	38	36	35	37 *	147(20%)	536(21.1%)
5	2014	22	2	36	38	34	38*	148(20.14%)	541(21.3%)
Total			11	183	229	170	142	735 (100.00%)	2540 (100.00%)

* (Five (5), Seven (7), Eight (8) and Nine (9) No of Authors)

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Table-2 reveals the authorship pattern of the articles published during the study period. The contribution published by scientists is calculated to 735 over the study period. It has been proved from the analysis that single author papers have decreasing trend and there by collective contributions have an increasing performance in scientific research activities.

Table: 3 Authorship Patterns

Sl.No	Authors	Total	Percentage (%)
1	Single Author	11	1.497
2	Two Author	183	24.898
3	Three Author	229	31.156
4	Four Author	170	23.129
5	Five Author	87	11.837
6	Six Author	33	4.49
7	Seven Author	15	2.041
8	Eight Author	5	0.68
9	Nine Author	2	0.272
	Total	735	100

Table 3 shows the majority 724(98.5%) of papers have been written in multiple authorship. It is seen that only 11 (1.5%) of the publications are single authored and 183 (24.898%) are two authored papers. Following by 229(31.156%) are highest contributed by three authors and the lowest number of contributions i.e., 2 (0.272%) contributed by eight authors.

Table: 4 Author's Productivity

Sl.No	Year	Total No of Papers with %	Total No of Authors with %	AAPP*	Productivity per Author*
1	2010	150(20.41%)	480 (18.9%)	3.2	0.31
2	2011	141(19.18%)	463(18.23%)	3.28	0.3
3	2012	149(20.27%)	520(20.47%)	3.5	0.29
4	2013	147(20%)	536(21.1%)	3.65	0.27
5	2014	148(20.14%)	541(21.3%)	3.66	0.27
	Total	735	2540	3.456	0.289

Notes: *Average Authors per Paper (AAPP) = Number of authors/Number of papers. Productivity per author = Number of papers/Number of authors (4) (source: telbib 1996-2012) ESO Telescope Bibliography)

Table 4 shows the data related to author's productivity. The total average number of authors per paper is 3.456 and the average productivity per author is 0.289. The highest number of author's productivity (541(21.3%)) was in 2014. The minimum number of author's productivity (0.27%) was in 2013 and 2014.



Figure: 2

Table: 5 Authorship by continent

Sl.No	Continent	No of Authors	Percentage (%)
1	Asia	486	19.134
2	Australia	27	1.063
3	Europe	468	18.425
4	North America	1549	60.984
5	South America	10	0.394
	Total	2540	100

Table 5 shows the distribution of authors by continent. The 735 research articles were contributed by 2540 authors from five continents all over world. The highest number of authors (1549, 60.984%) were from the North America followed by Asia (486, 19.134%). The lowest numbers of contributions (10, 0.394%) were from South America.

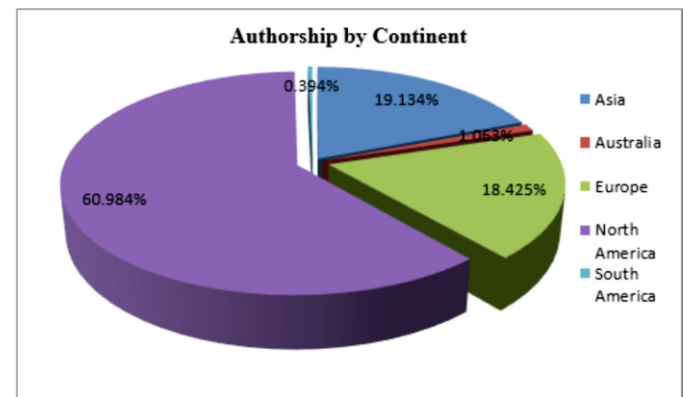


Figure: 3

Table: 6 Single and Multiple-Author Research Articles by Year

Sl. No	Year	Single Authored		Multiple Authored		Total	Percentage (%)
		Articles	%	Articles	%		
1	2010	6	54.54	144	19.89	150	20.41
2	2011	2	18.18	139	19.2	141	19.18
3	2012	—	0	149	20.57	149	20.27
4	2013	1	9.1	146	20.17	147	20
5	2014	2	18.18	146	20.17	148	20.14
	Total	11 (1.5%)	100	724 (98.5%)	100	735	100

Table 5 shows that the single and multi-authorship pattern by year. Single authored articles (11, 1.5%) were decreasing trend in the beginning to end of the years. there is a remarkable increase of multiple -authored articles during the study period. if there were more research articles contributed by multi-authors dominated.

Table: 7 Degree of Author Collaboration

SL. No	Year	Single Authored Papers (Ns)	Multiple Authored Papers(Nm)	Total (Nm+Ns)	Degree of Collaboration
1	2010	6	144	150	0.96
2	2011	2	139	141	0.985
3	2012	—	149	149	1
4	2013	1	146	147	0.993
5	2014	2	146	148	0.986
	Total	11	724	735	4.924

Table 6 shows the degree of author collaboration in the journal of *IEEE/ACM Transactions on Networking*. To determine the degree of collaboration in quantitative terms, the formula given by K. Subramanyam (1983) was used.

The formula is where
C= Degree of collaboration

$$Nm = \text{Number of multi authored papers} \quad C = Nm / (Nm + Ns)$$

$$Ns = \text{Number of single authored papers} \quad C = 724 / 735$$

In the present study the average value of C is C = 4.924

As a result, the average degree of author collaboration in the *IEEE/ACM Transactions on Networking* is 4.924, which clearly indicates its dominance upon multiple authored contributions.

Findings:

The analysis examined and discovered the following major findings and conclusions.

- It was identified that the highest number of contributions i.e., 150 (20.41%) were published in the year 2010 whereas the minimum number of 141(19.18%) was published in the year 2011.

- Out of total number of 735 research articles, the highest number of contributions i.e., 724 (98.5%) have been contributed by multiple authors.
- Out of 229 (31.156%) are highest contributed by three authors and 2 (0.272%) are lowest contributed by nine authors.
- The total average number of authors per paper is 3.456 and the average productivity per author is 0.289.
- The maximum articles were contributed by author from North America (1549, 60.984%) followed by Asia (486, 19.134%) is the second position.
- The average degree of author collaboration in the IEEE/ACM Transactions on Networking is 4.924

Conclusions:

The journal IEEE/ACM Transactions on Networking aims to provide an opportunity for interactions between networking in computer science technology especially within the communications group to introduce new concepts, methodologies, systems and technology in the field. It is one of the most extensive journals that appear in the IEEE society. This study has proven to be useful tool in the assessment of research publication of scientists in Engineering and technology.

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